

CLAIMS

1. A three-dimensional image measuring apparatus comprising:
  - an XYZ shaft transfer means mounted onto a base member;
  - a work stage mounted to the base member, for moving a measuring object to a measuring position and thereafter supporting it and having a predetermined reference surface set at a side thereof;
  - an image obtaining means in which it is moved toward X, Y and Z shafts by the XYZ shaft transfer means, scans a grating image by the frequency of N times to a side of the measuring object supported and fixed to the work stage, obtains the changed grating image by the measuring object by N times and alternately, scans the grating image by the frequency of N times to the other side of the measuring object, obtains the changed grating image by the measuring object by N times;
  - a light emitting means mounted to a side of the image obtaining means for generating and emitting light with a predetermined wavelength; and
- 15 a control unit which, by controlling the work stage and the XYZ shaft transfer means, irradiates light generated from the light emitting means mounted to a side of the image obtaining means to the reference surface set the side of the work stage, thereafter receives the reflected light image through the image obtaining means, measures a vertical distance, thereby maintaining a focus distance between the measuring object and the image obtaining means constantly, and receives the changed grating image obtained from the image obtaining means, thereby producing the three-dimensional image.
- 20 2. The three-dimensional measuring apparatus according to claim 1, wherein any one between a linear motor or a ball screw is adapted as the XYZ shaft transfer apparatus in order to transfer the image obtaining apparatus toward X, Y and Z shafts, respectively.
- 25 3. The three-dimensional measuring apparatus according to claim 1, wherein
  - a first guide which is installed to the base member to be fixed and has a predetermined reference to a side thereof;
  - a second guide which is installed in order to be transferred according to the size of the measuring object on the basis of the first guide; and

a guide transfer apparatus which is installed that the first and second guides 21 and 22, respectively, are crossed at right angles and for transferring the second guide on the basis of the first guide.

4. The three-dimensional measuring apparatus according to claim 1, wherein a ball screw is adapted as the guide transfer apparatus.

5. The three-dimensional measuring apparatus according to claim 1, the image obtaining means comprises:

10 a projection portion which produces a grating image through a light source emitting light and a diffraction grating, in which it is installed to a lower side of the light source for receiving the light emitted from the light source and moved by a grating transfer apparatus, and penetrates the produced grating image through a projection optical system installed to a lower side of the diffraction grating;

15 a distributor, which is installed to a lower side of the projection portion, distributes the grating image irradiated through a projection optical system of the projection portion through first and second mirrors transferred by a mirror transfer apparatus and distributes the grating image through third and fourth mirrors which are installed to be horizontal to the left/right side of the first and second mirrors and first and second filters; and

20 an imaging unit which is installed to a lower side of the distributor, reflects horizontally the changed grating image in which it is penetrated through the first and second filters of the distributor and irritated to the measuring object and then reflected, through an imaging mirror, and obtains the changed grating image through an imaging lens and an imaging device to a camera.

25 6. The three-dimensional measuring apparatus according to claim 5, a liquid crystal diffraction grating can be adapted as the diffraction grating.

7. The three-dimensional measuring apparatus according to claim 5, a PZT(piezoelectric) actuator is adapted as the grating transfer apparatus of the projection portion.

8. The three-dimensional measuring apparatus according to claim 5, the center lines of each inclined mirror surface of a first mirror and a second mirror of the distributor are crossed, contacted and formed.
9. The three-dimensional measuring apparatus according to claim 5, a triangle mirror  
5 is adapted as first and second mirrors of the distributor
10. The three-dimensional measuring apparatus according to claim 5 or 6, one among an air cylinder, a linear motor and a ball screw is adapted as the mirror transfer apparatus.
11. The three-dimensional measuring apparatus according to claim 5, a rotation mirror  
47a can be adapted as first and second mirrors of the distributor.
- 10 12. The three-dimensional measuring apparatus according to claim 11, wherein the apparatus further comprises a rotation apparatus for rotating the rotation mirror with a predetermined angle.
13. The three-dimensional measuring apparatus according to claim 12, a galvano mirror meter is adapted as a rotation apparatus.
- 15 14. The three-dimensional measuring apparatus according to claim 1, a laser pointer is used as the light emitting means.